Fecal coliform bacteria was the pollutant with the largest discrepancy between the State standard and measured concentrations. In both runoff and treated effluent, the fecal coliform concentrations -- 17,000/100 ml and 12,000/100 ml -- were much higher than the standard of 200/100 ml. Biological oxygen Demand (BOD_5) was not affected very much by the detention treatment, but even the untreated runoff had a median BOD_5 of only 4.9 mg/l. For comparison, the State standard for High Quality Waters, is 5 mg/l BOD_5 in effluents.

A second way to relate detention pond treatment to Tar River water quality is to calculate reductions in total loadings of pollutants that result from the treatment. This approach is more feasible, and timely, for N and P than for the other runoff constituents because it relates to a new plan recently developed to manage nutrient loading in the Tar basin (Hall and Howett 1994). According to the plan, point source dischargers will be responsible for meeting a total nutrient loading limit. They may achieve this overall limit by reducing their own effluent levels, by trading individual discharge levels among themselves, or by paying a fixed cost to a fund that implements nonpoint source controls.

Establishing the total nutrient loading limits required that all point and nonpoint source loads in the basin be identified and quantified. There is some variation among available Tar basin nutrient loading budgets, but they all agree that untreated urban runoff is a minor contributor to the total basin nutrient load (N.C. DEM 1989a; Stanley 1993; R. Dodd, personal communication). Expressed as percentages of total annual loads coming from urban runoff, the ranges are 2-4% for TN and 1-3% for TP. Although detention ponds like the one in this study achieve modest N and P removals (particulate forms only), these removals would have no significant impact on the overall Tar basin loadings, even if all urban runoff in the basin were treated. Consequently, it seems unlikely that urban detention will be involved in the nutrient trading program for this system.

Sediment Accumulation and Other Maintenance Issues

A model developed by the Metropolitan Washington Council of Governments (Schueler 1987) can estimate accumulation rates of sediments in the Greenville detention basin. The model is normally used to estimate runoff loads and is known as the Simple Model. It relates annual rainfall, a runoff coefficient, watershed area, and the EMC of a given pollutant to pollutant load (L, in pounds):

$$L = [(P) \times (P_J) \times (R_v) / 12] \times (C) \times (A) \times (2.72),$$

where P = rainfall (inches) per year; $P_J = 0.9$ (assumed fraction of storms producing measurable runoff); R_v = runoff coefficient; C = event mean concentration (EMC) of pollutant; and A = watershed area.